REMARKS

Acknowledgement of Allowance of Claims 70 and 71

Applicants hereby acknowledge the allowance of claims 70 and 71 by the Examiner in the January 3, 2005 Office Action.

Response to the §103 Rejections of Claims 61 and 63-67

In the January 3, 2005 Office Action, the Examiner withdrew previous grounds of rejections against claims 61 and 63-67 and cited new references as grounds for rejections of such claims under 35 U.S.C. §103(a). Specifically, the Examiner rejected claims 61 and 63-67 as being obvious over **Akad** DD224341A (hereinafter "Akad") in view of **Van Hove** et al. U.S. Patent No. 5,278,435 (hereinafter "Van Hove").

A copy of the English translation of the Akad reference is enclosed herewith for the Examiner's reference.

Applicants hereby disagree with the Examiner on the combinability of these two references, in light of the structural differences between such references, for the following reasons.

Akad discloses a method for removably depositing an epitaxial layer on a sapphire substrate, by initially forming a thin layer **(about 10Å) of hexagonal boron nitride** on the surface of the sapphire substrate via vapor-phase epitaxy at about 1050°C, thereby reducing the wettability of the substrate and allowing the epitaxial GaN or $Ga_xAl_{1-x}N$ layer subsequently formed thereon to separate from the substrate surface during cooling (see Akad, page 2, lines 11-31).

Further, Akad stresses the importance of having an appropriate boron nitride structure for the purpose of allowing proper formation and separation of the epitaxial GaN or $Ga_xAl_{1-x}N$ layer, by stating that:

> **"If the BN-layer is too weak, the epitaxial layer to be deposited onto this BN-layer in the next process step will not separate from the substrate; if the BN-layer is too strong, the orientation effect of the substrate will be compromised."**

In the January 3, 2005 Office Action, the Examiner conceded that the Akad reference fails to teach a single crystal epitaxial GaN layer, as required by claims 61 and 63-67 of the present application, but attempted to remedy such deficiency of Akad, by citing the Van Hove reference that teaches a method of growing a single crystal aluminum gallium nitride on a sapphire substrate and an intermediate matrix layer that may comprise boron nitride (see Van Hove, column 3, lines 18-25), and asserting that "*it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Akad with Van Hove et al's single crystal GaN because single crystalline materials are useful in semiconductor devices*" (see Office Action, page 3, lines 3-10).

Applicants respectfully disagree with the Examiner's assertion.

The Akad reference requires a thin layer of **hexagonal boron nitride** of **about 10Å in thickness**, for the purpose of allowing successful separation of the epitaxial GaN or $Ga_xAl_{1-x}N$ layer to separate from the substrate surface during cooling.

However, the Van Hove reference discloses an intermediate matrix layer 3 that is characterized by a thickness ranging from about 800Å to about 1700Å (see Van Hove, column 4, lines 40-41). Although such intermediate layer 3 may comprise, *inter alia*, boron nitride, it is about **80 to 170 times thicker** than the thin boron nitride layer required by the Akad reference. Further, there is **NO teaching or suggestion in the Van Hove reference about use of hexagonal boron nitride**.

Therefore, the Van Hove reference requires a boron nitride intermediate layer 3 for the purpose of forming a single crystal aluminum gallium nitride layer thereon, which are **fundamentally different** from the thin boron nitride intermediate layer required by the Akad reference for the purpose of allowing separation of the subsequently formed epitaxial GaN or $Ga_xAl_{1-x}N$ layer from the sapphire substrate upon cooling.

Further, the intermediate layer structure disclosed by Van Hove works very well for the intended purpose, i.e., allowing formation of a single crystal aluminum gallium nitride layer thereon. There is **no teaching or suggestion** in the Van Hove reference **for modifying** such intermediate layer structure, and **any attempt to modify** such intermediate layer structure, i.e., either by thinning such structure by 80 to 170 times or by using hexagonal boron nitride, **may defeat the purpose of such intermediate layer structure as intended by Van Hove** and result in formation of polycrystalline or non-crystalline aluminum gallium nitride layer instead.

Therefore, the hypothetical combination of the Akad reference and the Van Hove reference, as suggested by the Examiner, is inappropriate and cannot be used to establish a prima facie case of obviousness against Applicants' claimed invention as recited in claims 61 and 63-67.

Applicants respectfully request the Examiner to reconsider, and upon reconsideration to withdraw, the rejections of claims 61 and 63-67.

CONCLUSION

Based on the foregoing, all pending claims 61, 63-67, and 70-71 are in form and condition for allowance. The Examiner is requested to issue a Notice of Allowance accordingly.

No fee is rendered payable in connection with this Response. Nevertheless, the Office is hereby authorized to charge any official fee that is necessary for entry of this Response, and to credit any overpayment, to Deposit Account 08-3284 of Intellectual Property/Technology Law.

If any additional issues remain, incident to the formal allowance of the application, the Examiner is requested to contact the undersigned attorneys at (919) 419-9350 to discuss same.

Respectfully submitted,

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